Tomato Tracking Assignment Report

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1 Executive Summary

This Project Management Report provides a comprehensive overview of the Tomato Tracking project, focusing on the planning, execution, and management aspects. The project aimed to develop a system for automatically detecting, classifying, and tracking tomatoes. The project followed a structured approach, from initial planning through data collection, model development, testing, and documentation. Key management challenges included adapting the project scope to match the available data, managing timelines, and addressing unforeseen technical issues. Despite these challenges, the project was executed successfully, with all milestones met according to the schedule. The system achieved high accuracy in tomato detection and tracking, demonstrating significant potential for real-world agricultural applications. The following sections outline the project's timeline, issue management, and the overall effectiveness of the project management strategies employed.

2 Project Timeline

The project timeline chart below provides a visual representation of the project's major tasks, from data collection to documentation, tracking progress over time.

Figure 1: Project Timeline for the Tomato Tracking System. The chart tracks key milestones from data collection through to documentation.

3 Issue Tree

Throughout the project, several key issues were identified and systematically addressed to ensure the project stayed on track. These issues were primarily categorized into Data Preprocessing and Tracking and Counting problems. The Issue Tree below provides a visual representation of these challenges and their resolutions.
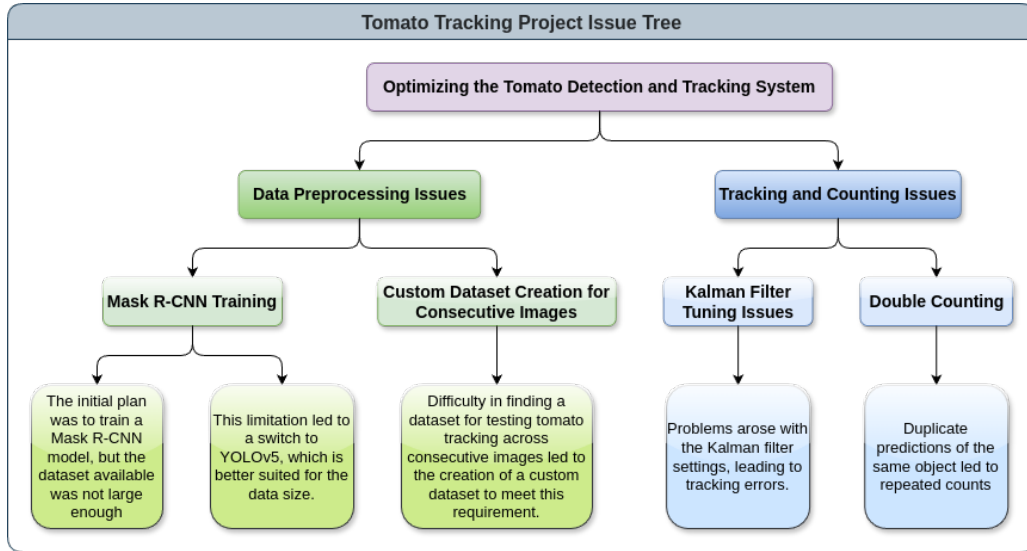
Figure 2: Tomato Tracking Project Issue Tree. This diagram outlines the primary challenges faced during the project and their resolutions.

4 Bugs and Problem List

Throughout the project, several specific bugs and issues were encountered and resolved. Each bug is detailed below, including a description of the issue, the resolution implemented, and the current status.

- **Bug 1: Data Conversion Error**
  - **Description:** An error occurred during the conversion of annotations from COCO format to YOLO format, leading to misaligned bounding boxes.
  - **Resolution:** Adjusted the conversion script to properly account for differences in coordinate systems.
  - **Status:** Resolved

- **Bug 2: Inconsistent Bounding Box Sizes During Tracking**
  - **Description:** Bounding boxes generated by DeepSort occasionally differed in size between frames, leading to inconsistencies in tracking.
  - **Resolution:** Refined the Kalman filter parameters within the DeepSort algorithm to improve consistency.
  - **Status:** Resolved

- **Bug 3: Overlapping Detections Leading to Double Counting**
  - **Description:** Overlapping detections of tomatoes in consecutive frames led to duplicate counts.
  - **Resolution:** Introduced a post-processing step to filter out duplicated detections based on spatial proximity and IoU thresholds.
  - **Status:** Resolved

5   Conclusion

The Tomato Tracking project was completed successfully, adhering to the planned timeline and within the allocated resources. The project management strategies, including regular monitoring, risk management, and issue tracking, were effective in navigating challenges and ensuring timely delivery. Key lessons learned include the importance of flexibility in project scope management, particularly in response to data limitations, and the value of early issue identification and resolution. Looking ahead, future projects may benefit from expanding the scope of testing to include more diverse datasets and exploring alternative tracking algorithms to further enhance performance. Overall, the structured approach taken here proved effective, with continued emphasis on clear communication, iterative testing, and documentation being critical to the project's success.

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